rf POWER LABS

INSTRUCTION MANUAL
WIDEBAND
RF POWER AMPLIFIER

MODEL: M110

SERIAL: 139

RF POWER LABS, INC.

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MP MASTER
MA24177

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1.0 INTRODUCTION

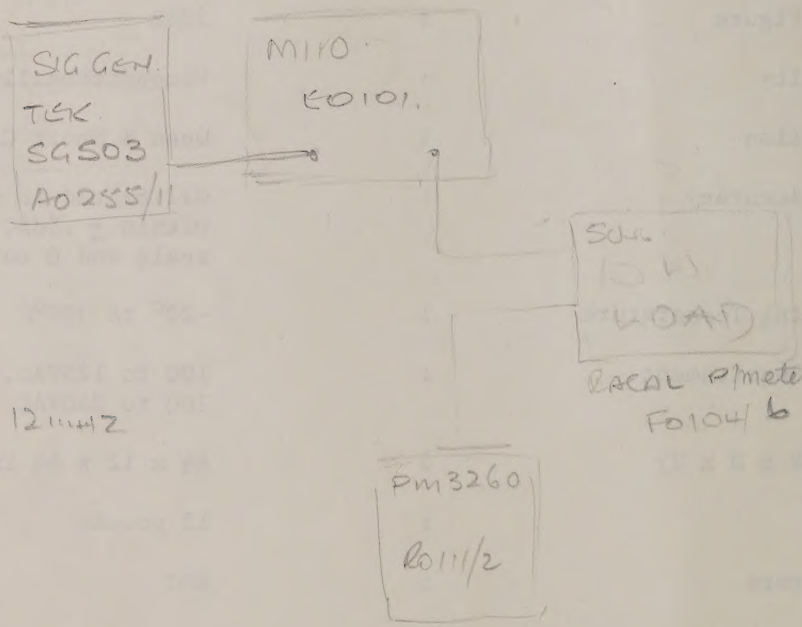
The Model M110 is a wideband solid state rf power amplifier covering the frequency range from 500 KHz to 150 MHz without tuning, bandswitching, or other adjustments of any kind.

Capable of producing over 10 watts of linear RF power at its output when driven from a standard signal or sweep generator, this instrument will amplify inputs of AM, FM, CW, SSB, pulse or other complex modulations with very little distortion.

The M110 is protected against load mismatch and overdrive and is unconditionally stable. The amplifier will not oscillate for any combination of input or output impedances, and can withstand open and short circuit load conditions.

2.0 SPECIFICATIONS

Frequency Range	:	500KHz to 150MHz
Gain (Average)	:	40dB
Flatness	:	± 1.5dB max.
Power Output	:	10 watts into 50 ohms
Distortion	:	All harmonics down 20dB at 10 watts
3rd Order Intercept	:	+50dBM typical
Input-Output Impedance	:	50 ohms
VSWR	:	2.0:1 typical
Noise Figure	:	12dB
Stability	:	Unconditionally Stable
Protection	:	Open & Short Circuit
Meter Accuracy	:	Calibrated in watts/50 ohms within ± .5dB. 15 watts full scale and 0 to 22 VRMS (lower scale)
Operating Temperature	:	-20° to +50°C
Power Requirement	:	100 to 125VAC. 50-60Hz or 200 to 240VAC. 50-60Hz
Size (W x D x H)	:	8½ x 12 x 6½ inches
Weight	:	15 pounds
Connectors	:	BNC


SIG GEN.
TEK
SG503
A0255/11
MIXO
K0101.
SCAL
LOAD
RACAL Pmeter
F0104 b
I/P 2MHz - 12MHz
PM3260
R0111/2

3.0 OPERATING INSTRUCTIONS

The Model M110 is a simple instrument to operate. Only three steps are needed to place the unit into operation.

1) Connect primary power
2) Connect a load to the output connector
3) Connect a signal source to the input connector

Always make sure that the load is capable of handling a power level of 15 or more watts, and that the input level does not exceed 1.0 VRMS.

Gradually increase the input signal level and observe a slow upward swing of the wattmeter. If the input signal is a CW signal, the output power may be read directly on the wattmeter. For good linearity, it is suggested that the user keep the output level below the red area on the scale. Higher output power levels may be obtained, but at the expense of increased distortion.

4.0 CIRCUIT DESCRIPTION

Refer to the schematic for the following:

The instrument consists of 3 basic circuit blocks.

a) RF Amplifier: This board consists of four stages of voltage amplification and frequency compensation.

b) The power supply is regulated to within ± 0.5 volts and is factory adjusted to +24 volts. Total current drawn is 2.7 amps or 65 watts of DC power.

c) The RF output signal is fed via 50 ohm cable to the output connector. A high impedance sampling RF voltmeter is connected at the output supplying DC current to operate the "wattmeter".

NOTE: If the output signal is fed into any load other than 50 ohms, the wattmeter will be out of calibration. Accurate voltage readings are obtained when operating the instrument into other than 50 ohms by using the lower scale on the meter (volts/RMS).

5.0 REGULAR ADJUSTMENT AND MAINTENANCE

Clean the air filter regularly by vacuuming from the rear panel. Do not remove air filter screws.

There are no periodic adjustments required to maintain the amplifier gain and power output characteristics.

CAUTION

Do not attempt to adjust the variable elements of the RF Amplifier. ALL adjustments are factory "pre-set" to compensate for normal component variations while operating the amplifier at full bandwidth and near full power. Any attempt to readjust these preset elements will disturb the gain versus alignment of the amplifier and will void the warranty.

6.0 SYSTEM SCHEMATIC

6.1 Parts List

6.2 Power Supply, Schematic and Parts List

6.3 System Wiring Diagram

SECTION 6.1

Parts List

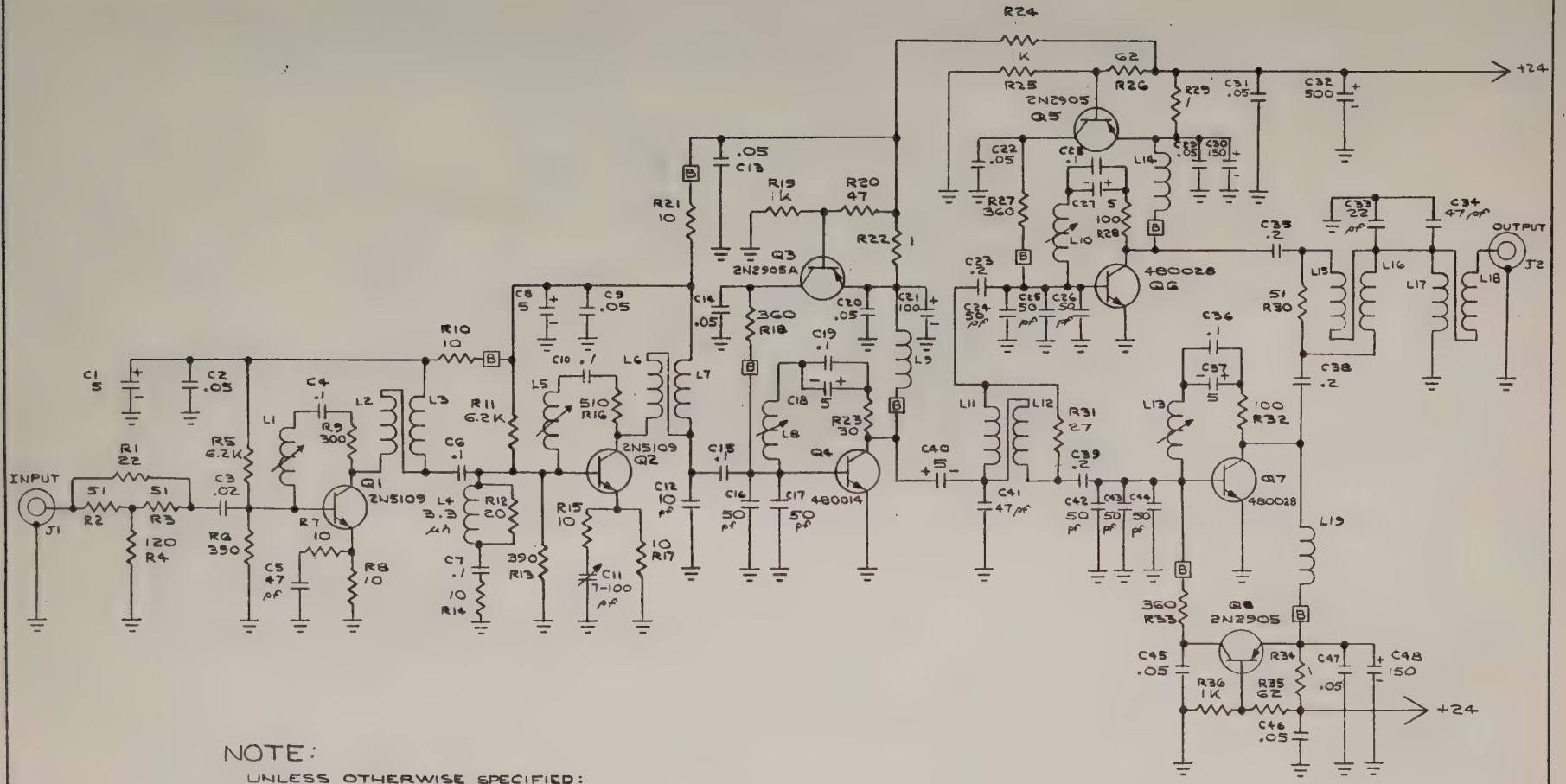
MODEL M110

6.1 AMPLIFIER - 10 WATTS

Quantity	Description	Number
1	Amplifier Assembly	250-1025
1	Cabinet	180008
1	Meter	290005
1	Meter, Bezel	690027
1	Fan	260006
1	Line Cord	600007
1	Line Cord, Receptacle	210001
1	Fuse, 1 amp	510002
1	Fuse Holder	510001
1	Terminal Strip	400011
A/R	RG-174/U Coaxial Cable	600004
1	Switch, Toggle	520011
1	Light, Pilot	390008
1	Resistor, 100K	470133
2	Connector, BNC	210011
2	Ground Lug	400001
1	Meter Circuit Board	250-6009
1	Resistor, Variable	440003
2	Capacitor, .01, 1KV	150016
1	Panel, Front	250-4077
1	Panel, Rear	250-4049
1	Power Supply Assembly	250-1020
1	Name Plate	250-8002
1	Instruction Manual	

OUTPUT AMPLIFIER ASSEMBLY

REFERENCE	QTY	DESCRIPTION	NUMBER
R1,12	2	Resistor, 22 ohm ¼W	470050
R2,3	2	Resistor, 51 ohm ¼W	470049
R4	1	Resistor, 120 ohm ¼W	470062
R5,11	2	Resistor, 6.2K ohm ¼W	470052
R6,13	2	Resistor, 390 ohm ¼W	470053
R7,8,14,15,17	5	Resistor, 10 ohm ¼W	470086
R10,21	2	Resistor, 10 ohm ½W	470022
R19,25,36	3	Resistor, 1K ohm ¼W	470093
R16	1	Resistor, 510 ohm ¼W	470012
R20	1	Resistor, 47 ohm ¼W	470091
R31	1	Resistor, 27 ohm ½W	470013
R23	1	Resistor, 30 ohm 1W	470058
R22,24,29,34	4	Resistor, 1 ohm 2W	470102
R26,35	2	Resistor, 62 ohm ¼W	470119
R18,27,33	3	Resistor, 360 ohm ½W	470076
R28,32	2	Resistor, 100 ohm 2W	470014
R30	1	Resistor, 51 ohm ½W	470009
C1	1	Capacitor, 8.2pF	150056
C2,9,13,14,20,22, 29,31,45,46,47	11	Capacitor, .05uF/50V	150033
C5,8,18,27,37,40	6	Capacitor, 6.8uF/50V	150046
C1,16,17,24,25, 26,34,41,42,43,44	11	Capacitor, 50pF Unelco	150069
C33	1	Capacitor, 20pF Unelco	150065
C12	1	Capacitor, Toothpick 10pF	150052
C21,30,32,48	4	Capacitor, Elec. 150uF/35V	150060
C11	1	Capacitor, Variable 7-100pF	150077
C3,4,6,7,10,15, 19,23,28,35,36, 39	12	Capacitor, Disc. .1uF/50V	150059
L1,5,8,10,13	5	Inductor, Variable	250-7002
L11-12	1	Transformer Input	250-3016
L4	1	Inductor, 3.3uH	700010
L9,14,19	3	Inductor, 100uH	700004
L2-3, L6-7	2	Transformer, 4:1Z	250-3013
L15-16	1	Transformer, Combining	250-3036
L17-18	1	Transformer, Output Match	250-3014
Q1,2	2	Transistor	480008
Q4,6,7	3	Transistor, RF Power	480014
Q3,5,8	3	Transistor, Bias	480006
	1	PCB	250-6011
	1	Heatsink	250-4507
	4	Heatsink	460005



NOTE:

UNLESS OTHERWISE SPECIFIED:
RESISTOR VALUES ARE IN OHMS
CAPACITOR VALUES ARE IN μfd

LAST REF DESIG:
C48, R36, Q8, J2, L19

REV.	CHANGE DESCRIPTION	BY

R.F. POWER LABS, INC.
11013 - 118th PL N.E.
KIRKLAND, WA. 98033

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

XX ± | XXX ± | ANG. ± | FRAC. ±

DRN. 8-2-77
CHK.
ENG.
APPVD.

SCHEMATIC DIAGRAM
MODEL M110

SIZE	DRAWING NO.	REV.
C	M110-S1	

SCALE | SHT. 1 OF 1

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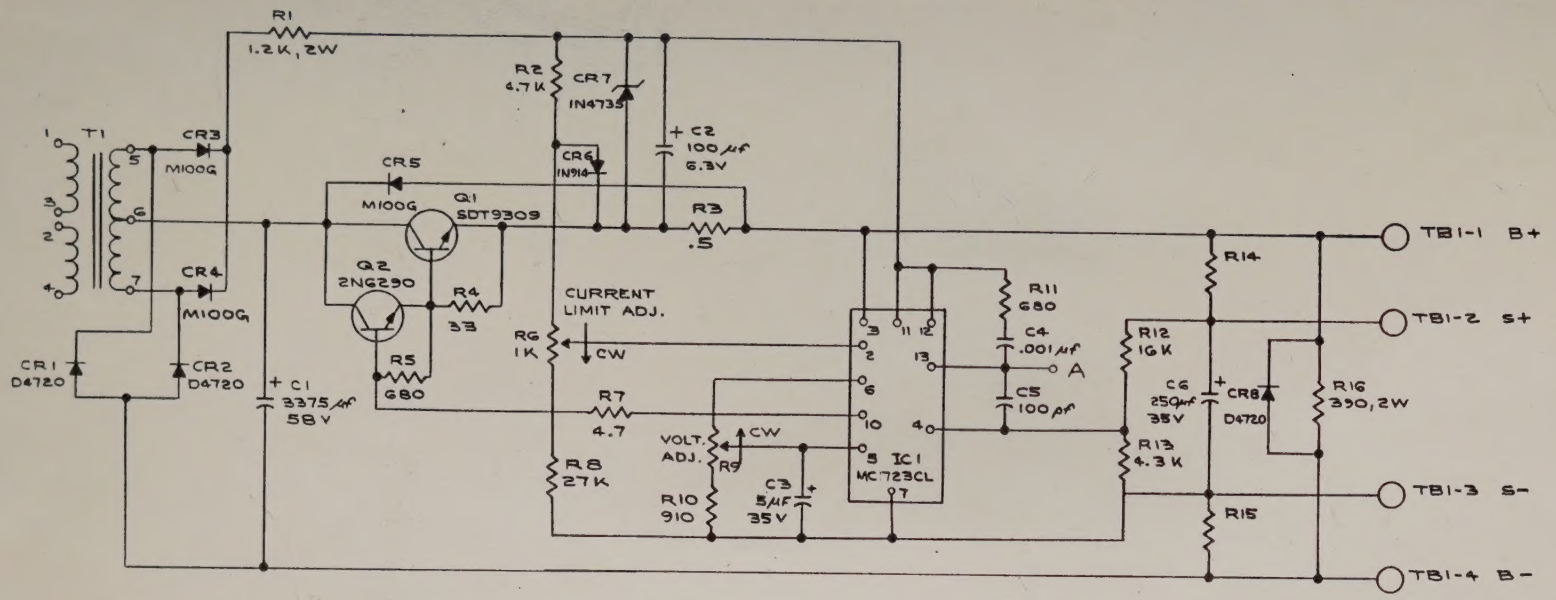

T1 - 115 V CONNECTIONS: LINE TO 1 & 3
JUMPER FROM 1 TO 2 & 3 TO 4

T1 - 230 V CONNECTIONS: LINE TO 1 & 4
JUMPER FROM 2 TO 3

NOTE:
RESISTOR VALUES ARE IN OHMS.

REV.	CHANGE DESCRIPTION	BY

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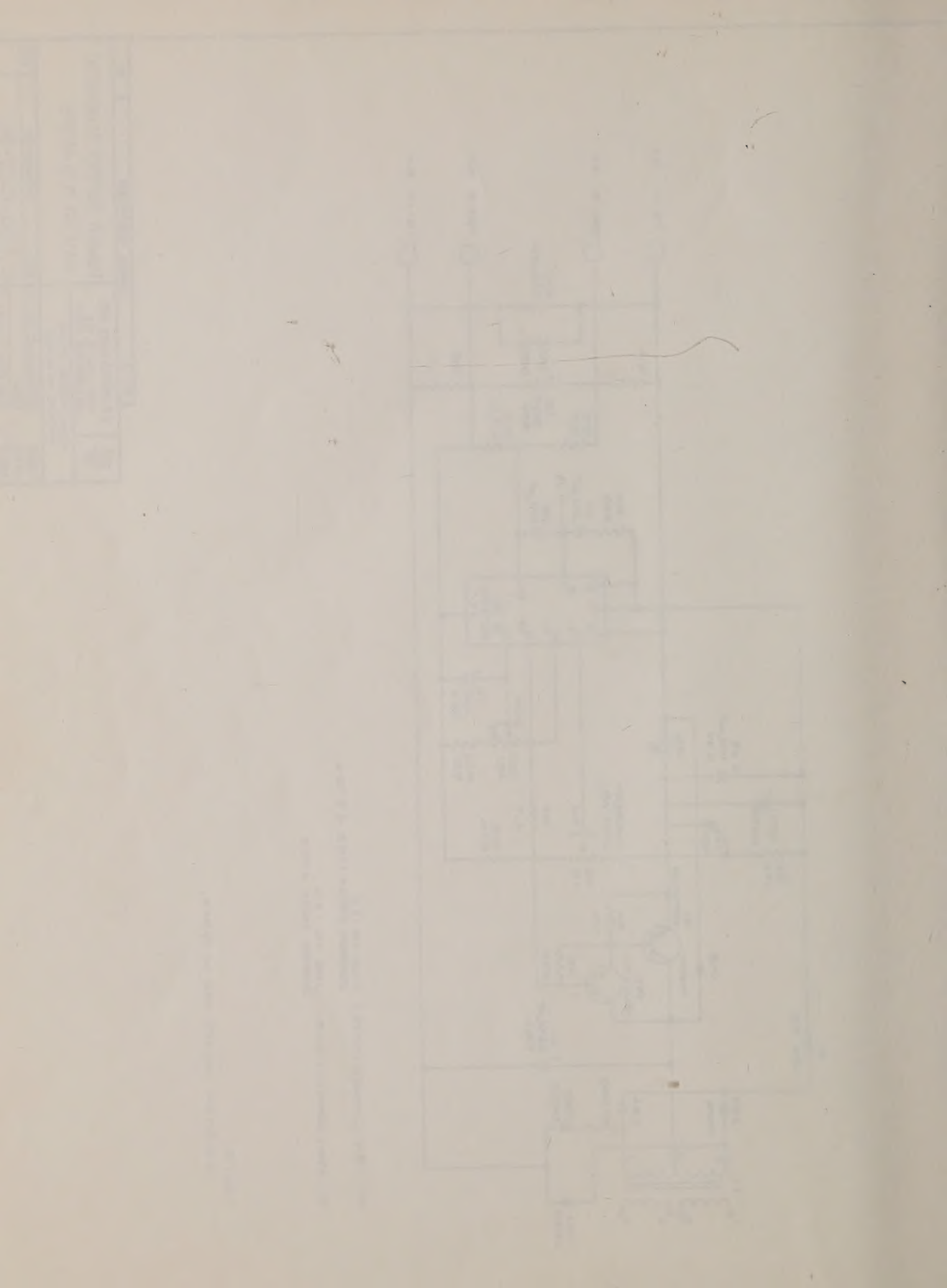
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES

POWER SUPPLY SCHEMATIC
+24 V. AT 3.3 AMPS

XX ±	DRN. 8-21-77	SIZE	DRAWING NO.	REV.
.XXX ±	CHK.	C	250-1020-S1	
ANG. ±	ENG. 8-21-77			
FRAC. ±	APPVD.	SCALE	SHT. 1 OF 1	

MANUFACTURED IN THE U.S.A.



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